Call Manager
User Manual and
Installation Guide
Revision 2.4

Catalog Number LTRT-00085

US: AudioCodes Inc, 2890 Zanker Road, Suite # 200, San Jose, CA 95134.
Tel: 408-577-0488 - Fax: 408-577-0492
International: AudioCodes Ltd, 4 HaHoresh Road, PO Box 14, Yehud 56470, Israel.
Tel: +972-3-539 4000 - Fax: +972-3-539 4040
China: AudioCodes, # 2721, South Tower, Kerry Center
1 Gaung Hua Road, Chao Yang District, Beijing 100020, P.R.China
Tel: 86-10-8529-9706 - Fax: 86-10-8529-9707
Technical Support: support@audiocodes.com

Notice

This User's Manual describes the AudioCodes™ Call Manager Application Software. Information contained in this document is believed to be accurate and reliable at the time of printing. However, due to ongoing product improvements and revisions, AudioCodes™ cannot guarantee the accuracy of printed material after the Date Published nor can it accept responsibility for errors or omissions.

For **Technical Support**, contact:
E-mail: support@audiocodes.com
In the US: fax 408-577-0492
In other countries: fax +972-3-539-4040

© 2001 AudioCodes Ltd.

This document is subject to change without notice.

Date Published: Apr-22-2001 Date Printed: Apr-30-2001

General Warranty

AudioCodes Ltd. (hereinafter "AudioCodes") warrants that its Products (hereinafter "Products") shall conform to AudioCodes' published specifications for a period of one (1) year. The foregoing warranty does not apply to any Products which have been subject to misuse, neglect, accident, or modification or which have been altered and are not capable of being tested by AudioCodes under its normal test conditions. AudioCodes' sole obligation to the Purchaser (hereinafter "Buyer") hereunder for Products failing to meet the aforesaid warranty shall be, at AudioCodes' discretion, to replace the non-conforming Products or issue the Buyer credit for the purchase price of the non-conforming Products, where within the warranty period: 1) AudioCodes has received written notice of any nonconformity; and 2) After AudioCodes' written authorization to do so the Buyer has returned the non-conforming Products to AudioCodes, freight prepaid; and 3) AudioCodes has determined that the Products are non-conforming and that such nonconformity is not a result of the Buyer's conduct. **No Products may be used in a life support application.** AudioCodes warrants that the Products sold hereunder shall at the time of shipment be free and clear of liens and encumbrances. This warranty extends to the Buyer only and may be invoked by the Buyer for its customers. AudioCodes shall not accept warranty returns directly from the Buyer's customers or users of the Buyer's products or devices. This warranty is in lieu of all other warranties whether express, implied or statutory including implied warranties of merchantability or fitness for particular purpose. AudioCodes shall not be liable for damages due to delays in deliveries or use. In no event shall AudioCodes be liable for any incidental or consequential damages due to breach of this warranty or for any infringement action initiated by a third party. The Buyer's sole remedy for any breach shall be limited to the remedies set forth herein and shall not exceed the sale price for the Products.

Acknowledgements

MediaPack™, TrunkPack® and NetCoder® are registered by AudioCodes Ltd.

AudioCodes™ acknowledges that various products referred to in this manual are subject to copyright and/or trademark by their respective registered holders.

Abbreviations and Terminology

Each abbreviation, unless widely used, is spelled out in full when first used, and only Industry standard terms are used throughout this manual.

Call Manager 2.4 Release Notes

These Release Notes summarize the differences between the previous version of Call Manager (2.3) and the current version (2.4).

1. Added support of signaling for trunk gateways and cards. Signaling is supported over proprietary TPNCP protocol.
2. New gateway/endpoint type is added in the GUI – E1/T1 type (for trunk gateways).
3. New option via the GUI to add Trunks for E1/T1 gateways.
4. Special E1/T1 gateways configuration is added (transport type, protocol, etc.).
5. Gateway's prefix must now be two digits.
6. Alarm statuses of the E1/T1 gateways can be viewed via the "Gateways & Endpoints Configuration" window.
7. "Trunks Monitoring" task is added to manage trunk statuses.
8. New call types are possible: FXS->E1/T1, E1/T1->FXS, E1/T1->E1/T1 (ISDN or CAS protocols are used for trunk gateways).
9. In the "Statistics" window, "Errors Number" group, a new sub-group "TPNCP Module" was added.

Earlier Release Notes

1. Deletion of all existing connections when exiting or deactivating the program. The User can disable the feature via the "Configurations" window ("General" tab).
2. Error and warning messages of the logger are **also** saved in a different file. The parameters of the file can be managed via the "Configurations" window ("Logger" tab).
3. Filtering logger messages is possible. Filtering can be applied to the "Debug" window or log file or both. The filter can be configured via the "Configurations" window ("Logger" tab).
4. New type of log messages added – Warnings. Such messages are usually generated when a Call fails or there are communication problems.
5. In the "Gateways & Endpoints Configuration" window, an option was added to select a group of gateways/endpoints. A number of operations (such as removing, disabling, enabling) can be applied to the group.
6. In the "Gateway Properties" window, an option was added to change the Gateway's IP address (only when Call Manager is inactive).
7. In the "Endpoints Properties" window, a new field "Description" was added. It's a regular text field for administrator notes concerning the endpoint.
8. FXS *immediate calls* are added. *Immediate calls* are regular calls where the phone number is dialed automatically when lifting the handset. The phone number to be dialed should be defined in the "Endpoint Properties" window.
9. Gateway's phone number is added. The phone number is used when the User wants to select a random line of the specified Gateway. Note that the chosen endpoint type is the same type as the parent gateway.
10. FXO to FXO calls are added.
11. In the "Statistics" window, "Failed Calls" group, a new sub-group "Timeout Exceeded" was added.
12. Added support of waiting calls for FXS to FXS calls
13. Added support of transferred calls for all types of calls.
14. New configuration parameter "Transfer flash to PBX" was added to "Configurations" window ("Telephony" tab). The parameter is used to define the program operation when a "Flash" signal is received on the FXS line.

15. Added option to backup and restore the program's database. The option is available from the "File" menu in the main window.
16. Digit map is extended to get "xx#".
17. Gateway's type can be changed in run-time.
18. The "Audit task" of the program is changed. Different levels of monitoring are now possible:

    - Endpoints monitoring;
    - Gateways monitoring;
    - Calls monitoring;

19. For FXO to FXO calls, it's possible to disconnect a call when silence is detected in one or both directions.
20. A special feature has been added in FXO to FXS calls. The prefix phone number of the source FXO gateway is dialed when the destination FXS answers.
21. In FXO to FXS calls, the scenario for busy destination is changed. According to the new scenario, the incoming call from PBX is not answered and the caller gets a ring back tone generated by the PBX. (According to the old scenario, the incoming call was answered and the caller got a busy signal.)

Table of Contents

1. CALL MANAGER SOFTWARE 9
1.1 SOFTWARE INSTALLATION PROCEDURE 9
2. CALL MANAGER APPLICATION 11
2.1 CONFIGURATION OF GATEWAYS AND ENDPOINTS 11
2.1.1 Gateway Configuration 14
2.1.2 Trunk Configuration 21
2.1.3 Endpoint Configuration 22
2.1.3.1 FXO Type Specific Configuration 26
2.1.3.2 Transparent Type Specific Configuration 28
2.1.3.3 E1/T1 Type Specific Configuration 29
2.2 CALLS SUPPORTED BY CALL MANAGER 29
2.2.1 FXS *to/from* FXS Call 30
2.2.2 FXO to/from FXO Call 30
2.2.3 FXO *to* FXS Call (incoming call) 30
2.2.4 FXS *to* FXO Call (outgoing call) 30
2.2.5 Transparent *to/from* Transparent Call 31
2.2.6 Transparent *to* FXS Call 31
2.2.7 FXS *to* Transparent Call 31
2.2.8 Selecting All Transparent Endpoints 31
2.2.9 FXS *to* E1/T1 Call (outgoing call) 32
2.2.10 E1/T1 *to* FXS Call (incoming call) 32
2.2.11 E1/T1 *to* E1/T1 Call (tandem call) 32
2.3 CALL MANAGER ACTIVATION/DEACTIVATION 32
2.3.1 Debug Window 33
2.3.2 Call Status 33
2.3.2.1 Call Configuration 34
2.3.3 Statistics 35
2.4 CALL MANAGER CONFIGURATION 39
2.4.1 Logger 39
2.4.1.1 Configuring the Log File of the Application 40
2.4.1.2 Configuring the Errors Log File of the Application 40
2.4.1.3 Configuring the Logger Window 41
2.4.1.4 Message Filtering 42
2.4.2 Statistics 43
2.4.3 Audit Task 43
2.4.3.1 Endpoints Monitoring Configuring 44
2.4.3.2 Configuration of Trunk Monitoring 45
2.4.3.3 Configuration of Gateway Monitoring 45
2.4.3.4 Configuration of Call Monitoring 45
2.4.4 Retransmissions 46
2.4.5 General 47
2.4.6 Telephony 48
2.4.6.1 Tone Parameters 48
2.4.6.2 Configuring Phone Numbers 49
2.4.6.3 Configuring Call Types 49

List of Figures

Figure 2-1: Call Manager Main Window 11
Figure 2-2: Configuration of Gateways & Endpoints 12
Figure 2-3: Alarm Status 13
Figure 2-4: Gateway Properties - General 15
Figure 2-5: Gateway Properties – Common Defaults 16
Figure 2-6: Gateway Properties – MGCP Options 18
Figure 2-7: Gateway Properties – TPNCP Options 20
Figure 2-8: Trunk Properties - General 22
Figure 2-9: Endpoint Properties – General 23
Figure 2-10: Endpoint Properties – MGCP Capabilities 25
Figure 2-11: FXO Endpoint Specific 27
Figure 2-12: Transparent Endpoint Specific 28
Figure 2-13: Supported Calls 29
Figure 2-14: Calls Status 33
Figure 2-15: Call Configuration 34
Figure 2-16: Statistics 35
Figure 2-17: Failed Calls Properties 37
Figure 2-18: Retransmission Properties 38
Figure 2-19: Error Properties 38
Figure 2-20: Logger Configuration 40
Figure 2-21: Logger Filtering 42
Figure 2-22: Statistics Configuration 43
Figure 2-23: Audit Task Configuration 44
Figure 2-24: Retransmissions Configuration 46
Figure 2-25: General Configuration 47
Figure 2-26: Telephony Configuration 48

1. Call Manager Software

1.1 Software Installation Procedure

Call Manager can be installed on Windows® NT or Windows® 98.

To install Call Manager, run the Setup.exe file from the package supplied. The package can be on five diskettes of 1.44 MB each, or a CD-ROM package containing 10 files (total size ~6 MB).

During the installation procedure, the User is prompted to answer typical installation questions (destination directory, folder name, and so on).

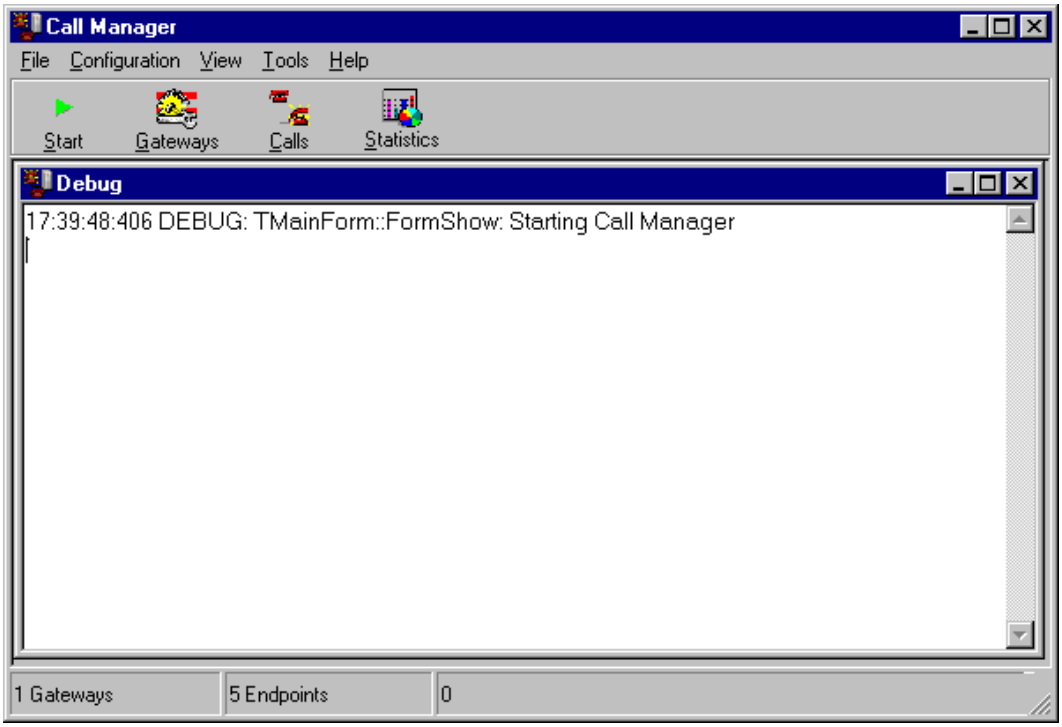
After the installation procedure, the destination directory will contain the program's executable file CallAgent.exe, the Log file CallManager.log and the directory "data" containing the database's definitions.

Reader's Notes

2. Call Manager Application

Start Call Manager from the Programs menu; the following window appears:

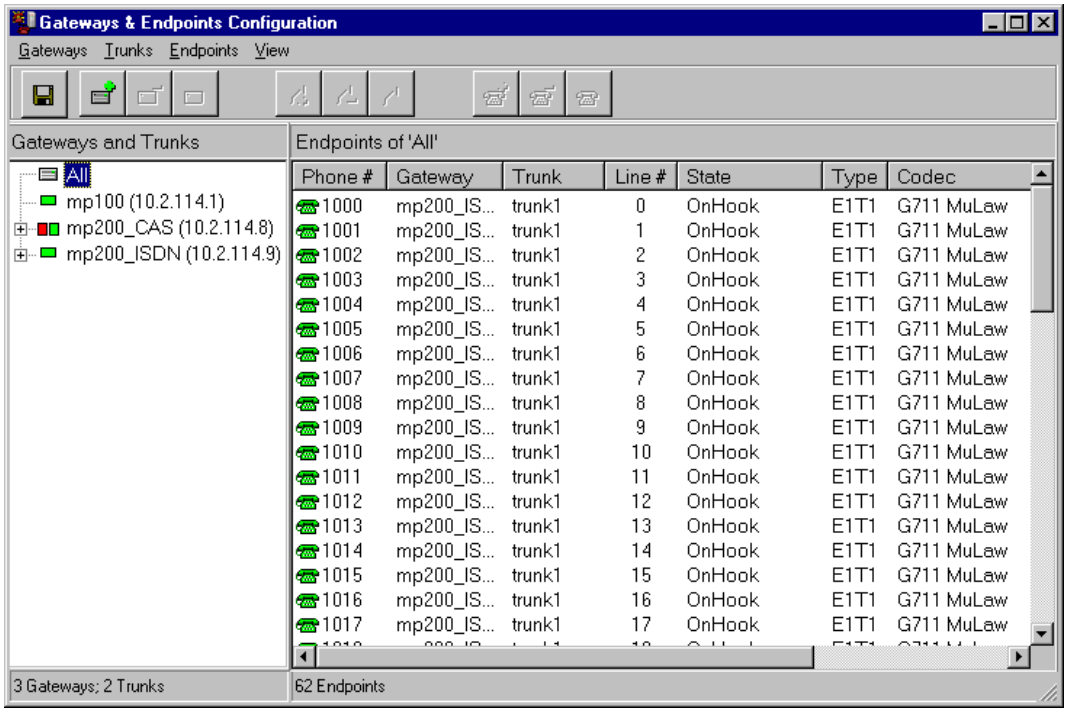
Figure 2-1: Call Manager Main Window



2.1 Configuration of Gateways and Endpoints

In Call Manager's main window, shown above, select "Configuration" and then "Gateways & Endpoints"; the Gateways & Endpoints Configuration window opens as in Figure 2-2:

Figure 2-2: Configuration of Gateways & Endpoints


Gateways & Endpoints Configuration
Gateways Trunks Endpoints View
Gateways and Trunks
All
mp100 (10.2.114.1)
mp200_CAS (10.2.114.8)
mp200_ISDN (10.2.114.9)
Endpoints of 'All'
Phone # Gateway Trunk Line # State Type Codec
1000 mp200_IS... trunk1 0 OnHook E1T1 G711 MuLaw
1001 mp200_IS... trunk1 1 OnHook E1T1 G711 MuLaw
1002 mp200_IS... trunk1 2 OnHook E1T1 G711 MuLaw
1003 mp200_IS... trunk1 3 OnHook E1T1 G711 MuLaw
1004 mp200_IS... trunk1 4 OnHook E1T1 G711 MuLaw
1005 mp200_IS... trunk1 5 OnHook E1T1 G711 MuLaw
1006 mp200_IS... trunk1 6 OnHook E1T1 G711 MuLaw
1007 mp200_IS... trunk1 7 OnHook E1T1 G711 MuLaw
1008 mp200_IS... trunk1 8 OnHook E1T1 G711 MuLaw
1009 mp200_IS... trunk1 9 OnHook E1T1 G711 MuLaw
1010 mp200_IS... trunk1 10 OnHook E1T1 G711 MuLaw
1011 mp200_IS... trunk1 11 OnHook E1T1 G711 MuLaw
1012 mp200_IS... trunk1 12 OnHook E1T1 G711 MuLaw
1013 mp200_IS... trunk1 13 OnHook E1T1 G711 MuLaw
1014 mp200_IS... trunk1 14 OnHook E1T1 G711 MuLaw
1015 mp200_IS... trunk1 15 OnHook E1T1 G711 MuLaw
1016 mp200_IS... trunk1 16 OnHook E1T1 G711 MuLaw
1017 mp200_IS... trunk1 17 OnHook E1T1 G711 MuLaw
3 Gateways; 2 Trunks
62 Endpoints

The two-pane window ”Gateways & Endpoints Configuration” shown above, enables the configuration of *Gateways/Trunks* and *Endpoints* to be controlled by Call Manager.

The left pane represents all Gateways and Trunks in the system.

The right pane represents Endpoints for the chosen Gateway/Trunk or all Endpoints.

Icons of the Gateways, Trunks and Endpoints change their color according to their current status.

The color of the Gateway and Endpoint status icon indicates a status according to Table 2-1.

The color of the Trunk Status icon indicates a status according to Table 2-2.

Table 2-1: Gateway and Endpoint Status Icon

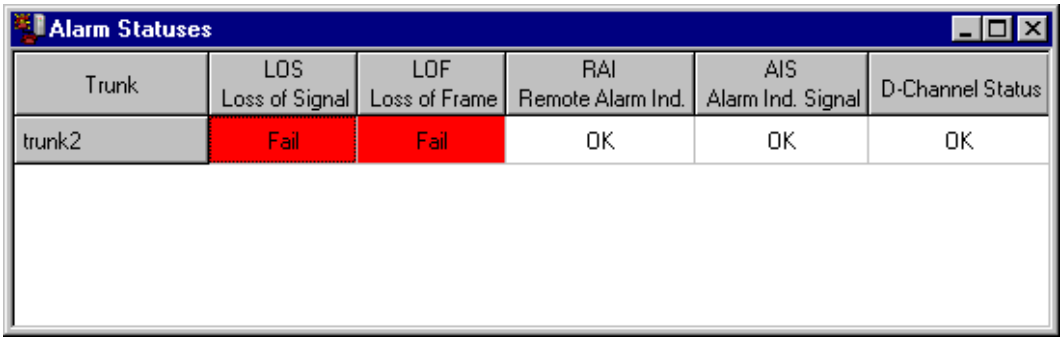
Icon Color	Gateway and Endpoint Status
Green	"Active" state; connections are possible.
Red	"Disconnected" state; there is no response from the Gateway/Endpoint.
Red & Green	Can be seen for E1/T1 trunk gateways only; the Gateway is connected but at least one of its trunks has an Alarm or an unsynchronized D-channel.
Black	"Disabled" state; Gateway/Endpoint manually disabled by the User.

Table 2-2: Trunk Status Icon

Icon Color	Trunk Status
Red	There's an alarm on the trunk, or else PRI D-channel is not synchronized (for PRI ISDN only).
Green	The trunk can be used for calls. There is no alarm and PRI D-channel is synchronized.

To view an alarm's details, select the Trunk, right-click and choose the option "Show Alarm Status"; the Alarm Status window opens:

Figure 2-3: Alarm Status



Note that the option is available when the program is in Active state only.

To obtain the actual status of Gateways, Trunks and Endpoints, manually refresh the Gateways & Endpoints Configuration window (shown in Figure 2-2 on page 11) by pressing F5 or by selecting the option “Refresh” from the “View” menu.

To view Endpoints (in Phone # or Gateway sequence), click on the appropriate column’s title.

All changes to the database are saved in cache memory. When the application exits, data is saved on the hard disk. To save data from the cache memory on the hard disk, perform 1 or 2:

1. Click the icon Save to Database in the Gateways and Endpoints Configuration window (shown in Figure 2-2 on page 11).
2. Select the option “Save to DB” on the Gateways menu in the Gateways and Endpoints Configuration window.

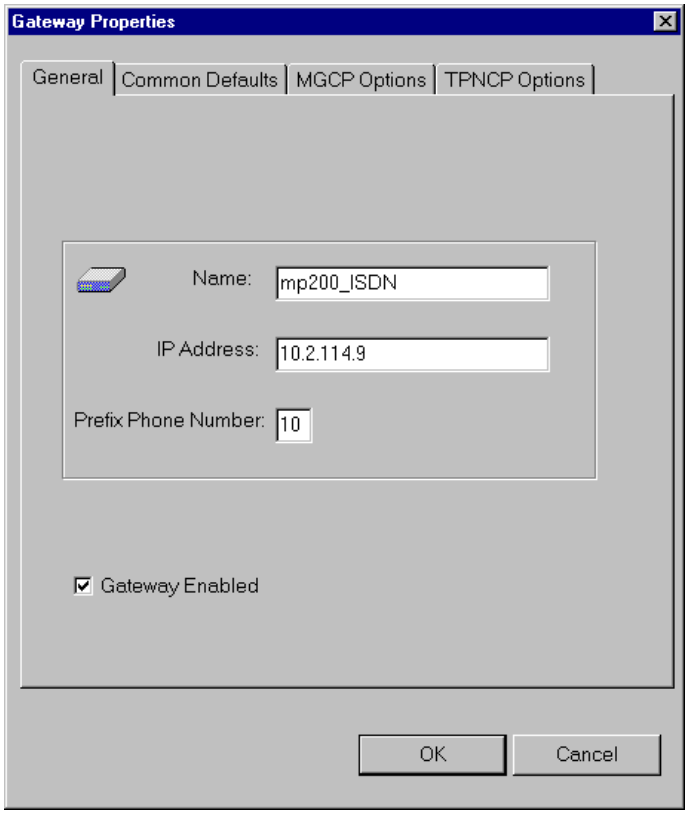
A back-up of the current database can also be created as a file. The option is available from Call Manager’s main window (shown in Figure 2-1) on the “File” menu. The backed-up database can be restored from the file at any time. Note: The restored database fully replaces the current one, so it’s recommended to back up the current database before using the “Restore” option.

2.1.1 Gateway Configuration

To add/remove/edit a Gateway, click the “Add Gateway”, “Edit Gateway” or “Remove Gateway” icons on the Toolbar of the Gateways and Endpoints Configuration window (shown in Figure 2-2 on page 11). The same options are on the “Gateways” menu.

For each Gateway, specify the name and the IP address of the Gateway.

Figure 2-4: Gateway Properties - General



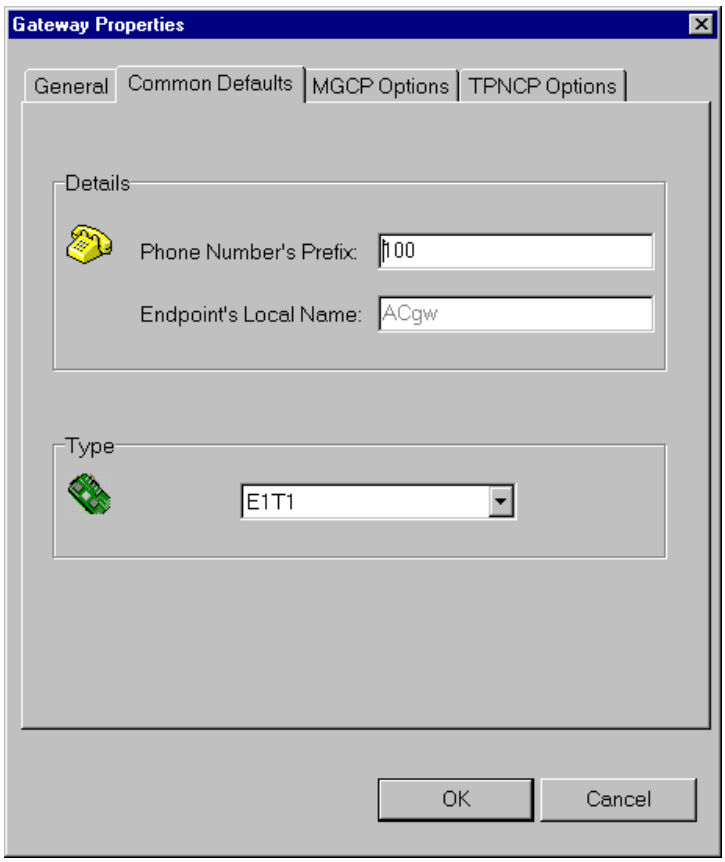
"Prefix Phone Number" can be used to obtain a random line of the specified Gateway.

Clearing the "Gateway Enabled" check box disables the Gateway. A disabled Gateway doesn't participate in the activity of Call Manager.

The Gateway configuration also contains the default parameters of its Trunks and Endpoints.

Select the "Common Defaults" tab to set the common default parameters as in Figure 2-5 on page 16.

Figure 2-5: Gateway Properties – Common Defaults



The parameters in the window are divided into 2 categories:

1. **Details**
   - Phone Number's Prefix - the common phone number's prefix for the Endpoints of the Gateway.
   - Endpoint's Local Name - the common prefix for the Endpoints' local names.
2. **Type**
   - Select FXS, FXO or Transparent default according to Gateway type.

- Select FXS for Endpoints that are connected to phones; select FXO for Endpoints connected to PBX or to PSTN.

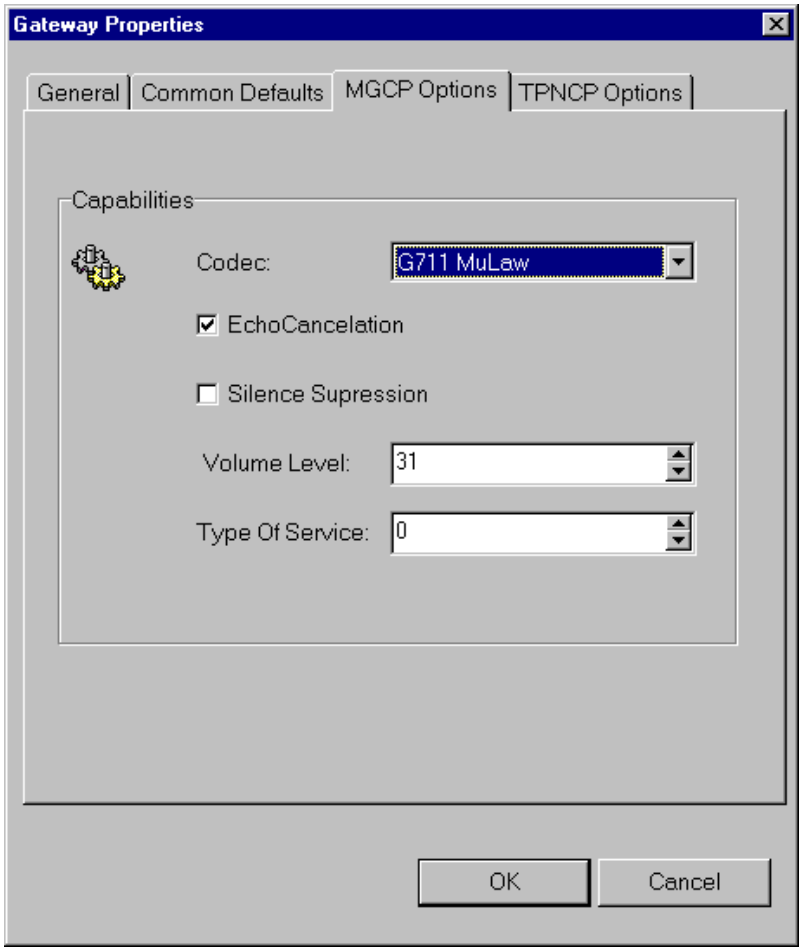
Transparent type can be defined for any Endpoint. A transparent Endpoint doesn't support any signaling. To create connections to or from a transparent Endpoint, see Section 2.1.3.2 (Transparent Type Specific Configuration) on page 28. Transparent type can be used for testing the MP-200 E1/T1 trunk Endpoints.

Select E1/T1 type for E1/T1 trunk gateways that support TPNCP (AudioCodes proprietary) protocol.

For a Gateway that contains mixed Endpoints, enter the Endpoint configuration window and select the correct Endpoint type.

Select the “MGCP Options” tab to set the MGCP default parameters:

Figure 2-6: Gateway Properties – MGCP Options



Parameters in the Gateway Properties window are:

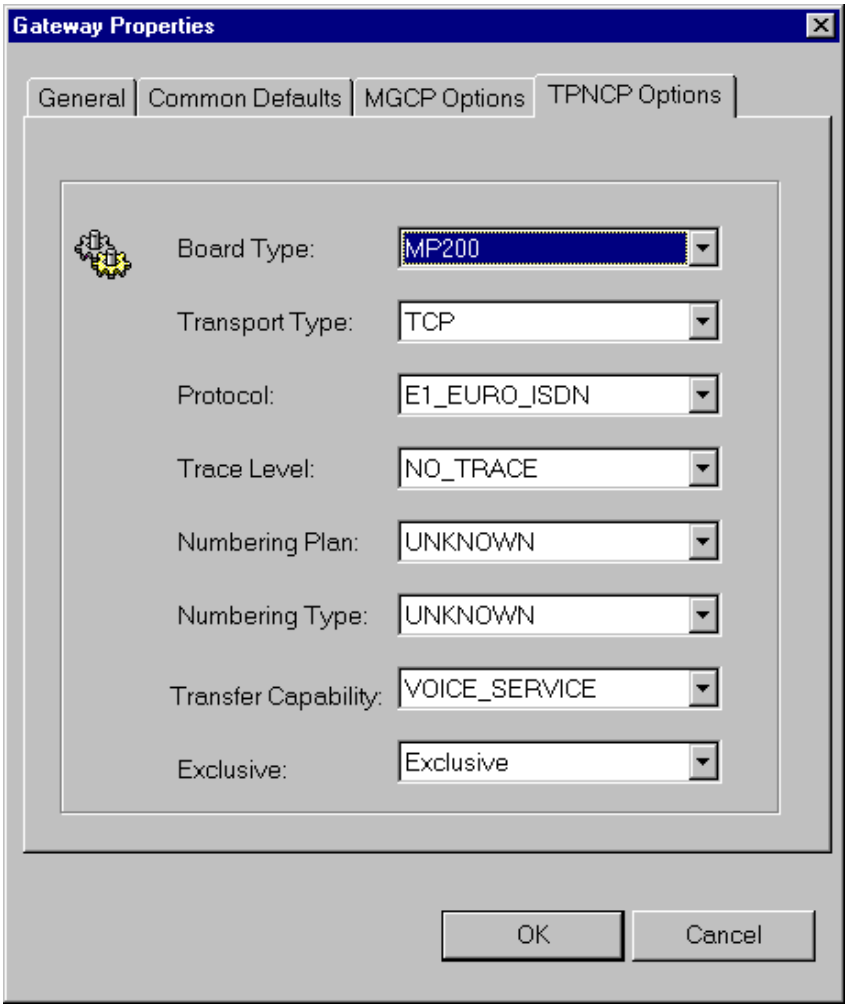
1. **Codec**: The default voice compression coder.
2. **Echo Cancelation**: ON when the check box is checked.
3. **Silence Suppression**: ON when the check box is checked.
4. **Volume Level**: Should be in the range 0-63.
5. **Type of Service**: For IP datagram should be in the range 0-255.

The scope of capability parameters applies to all Gateway Trunks and Endpoints selected to use "*Gateway's Default Capabilities".*

The Gateway capabilities can be changed during the operation of Call Manager.

Select the “TPNCP Options” tab to set the TPNCP default parameters (for E1/T1 type only):

Figure 2-7: Gateway Properties – TPNCP Options



Parameters in the Gateway Properties window used for gateway initialization are:

1. Type of board
2. Transport type - UDP or TCP.
3. Trunk protocol - also defines trunk’s type – E1 or T1.

4. Trace Level - set for debugging purposes, according to the TPNCP manuals.

The other parameters are used to configure PRI ISDN Setup message.

The scope of these parameters applies to all Gateway Trunks selected to use "*Gateway's Default Capabilities".*

Note 1: The useful parameters of the above fields, for Media Gateway modules, are Board Type and Transport Type.

Note 2: Changes to the above parameters are not applied after the operation of Call Manager.

2.1.2 Trunk Configuration

To add a Trunk, perform 1, 2 or 3 below:

1. Right-click on the host Gateway (in the Gateways and Endpoints Configuration window shown in Figure 2-2 on page 11) and choose the option Add Trunk; the Trunk Properties window opens.
2. Select the host Gateway (also in the Gateways and Endpoints Configuration window) and on the Trunks menu, choose the option Add Trunk; the Trunk Properties window opens.
3. Select the host Gateway and on the Toolbar, click the icon Add Trunk.

For each Trunk, specify the name and the Trunk ID according to the physical trunk ID number.

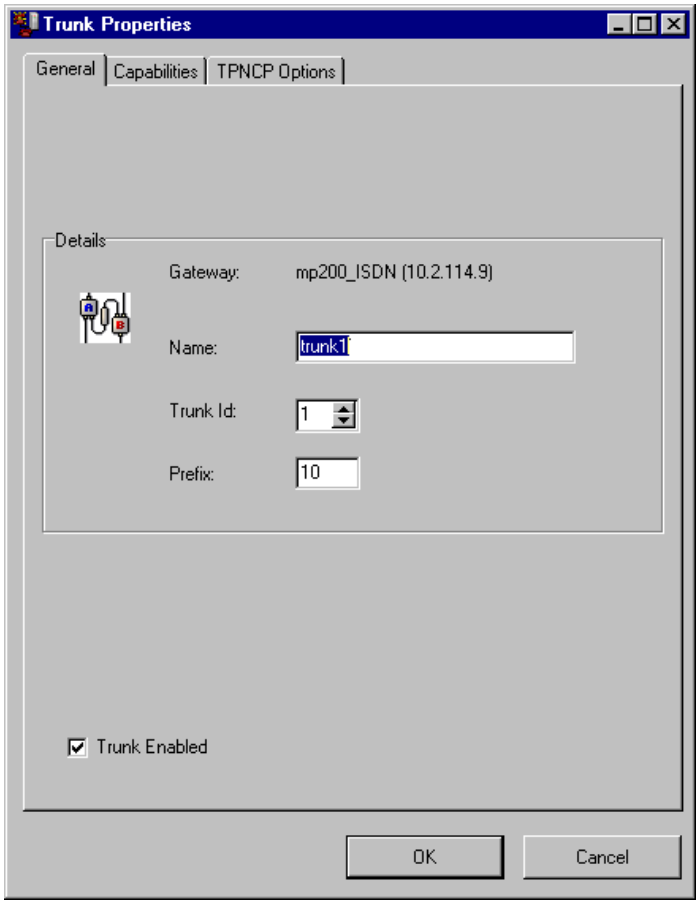
To edit/remove a Trunk:

1. Navigate to the Trunk you want to edit/remove (in the Gateways and Endpoints Configuration window shown in Figure 2-2 on page 11) under the relevant Gateway.

Now perform either step 2, 3 or 4:

2. Right-click on it and choose the option Edit Trunk/Remove Trunk.
3. Select it and on the Trunks menu choose the option Edit Trunk or Remove Trunk.
4. Select it and click the Edit Trunk or icon Remove Trunk on the Toolbar.

Figure 2-8: Trunk Properties - General



"Prefix" can be used to obtain a random line of the specified Trunk.

The "Capabilities" tab is identical to the "MGCP Options" tab from the Gateway definition window. It inherits all data from the Host gateway. The User can change the parameters to be unique per trunk.

The "TPNCP Options" tab is identical to the "TPNCP Options" from the Gateway definition window.

2.1.3 Endpoint Configuration

For each Trunk under any defined Gateway, a number of Endpoints can be specified/added.

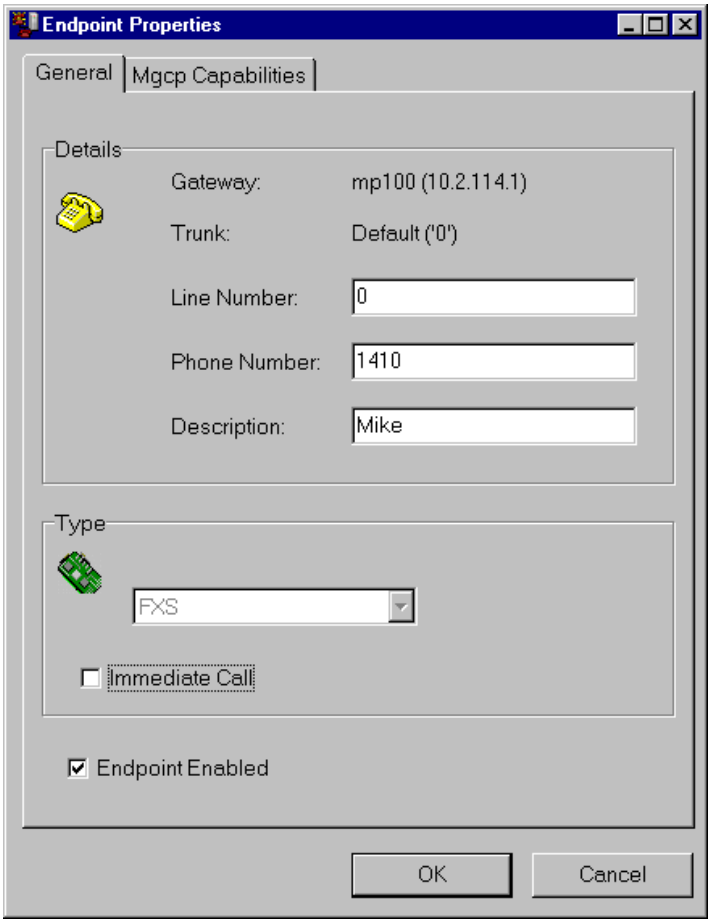
To add an Endpoint under a Trunk:

1. Expand the Gateway under which the Trunk was added and navigate to the Trunk to which you want to add an Endpoint (in the in the Gateways and Endpoints Configuration window as shown in Figure 2-2 on page 11).

Now perform either step 2, 3 or 4:

2. Right-click on the Trunk and choose "Add Endpoint" from the pop-up menu; the Endpoint Properties window opens.
3. Select the Trunk and choose the "Add Endpoint" option from the "Endpoints" menu; the Endpoint Properties window opens.
4. Select the Trunk and click the Add Endpoint icon on the Toolbar; the Endpoint Properties window opens.

Figure 2-9: Endpoint Properties – General



The following general Endpoint Properties can be defined (as shown in Figure 2-9).

1. *Line Number* is the Gateway port number (0 to 7 for MP-100).
2. *Phone Number* is a string of digits (default is 4 digits). The number should be unique for Call Manager. Digit map can be configured via "Configuration" window, "Telephony" tab.
3. *Description* is a free description of the endpoint (like a name of the line's owner).
4. *Type* is the Endpoint type (FXS/FXO/Transparent/E1/T1).
5. *Immediate Call* – when selected, "Dest Phone Number" field should be a valid phone number, belonging to one of the Endpoints controlled by Call Manager (gateway's prefixes and random calls prefixes are possible too). When the defined endpoint is the initiator of a call, the specified phone number is dialed automatically.
   Endpoint Enabled – if not selected, the Endpoint is disabled.

Sequence of Endpoints can be defined as an interval of channels in the field "Line Number".

For example, in the above window, the "Line Number" field is defined as 0-2, and all the other fields are unchanged.

Instead of one Endpoint, three Endpoints are created:

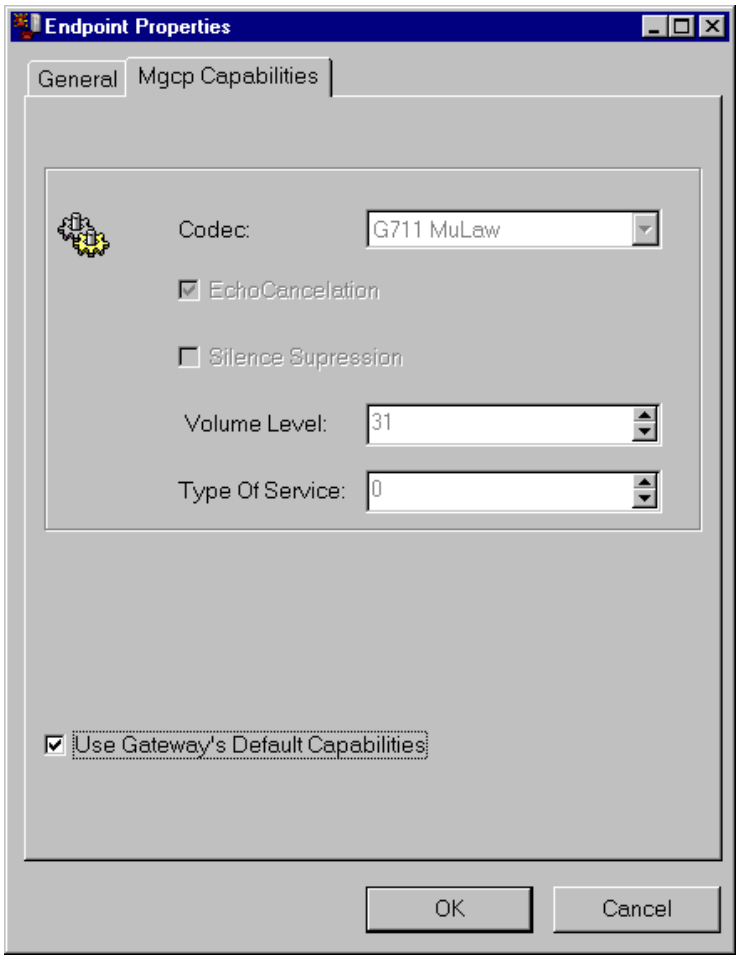
channels: 0,1,2; telephone numbers: 1450, 1451, 1452.

Select "Type" and all the other parameters stay as defined in the original window.

Note: To change an Endpoint's type, disable the endpoint, set the new type, and then enable the Endpoint.

Select the "Capabilities" tab in order to set Endpoint capabilities:

Figure 2-10: Endpoint Properties – MGCP Capabilities



The following MGCP Capability Endpoint Properties can be defined (as shown in Figure 2-10):

- Codec is the voice compression coder type.
- Echo Cancelation is ON when the check box is checked.
- Silence Suppression is ON when the check box is checked.

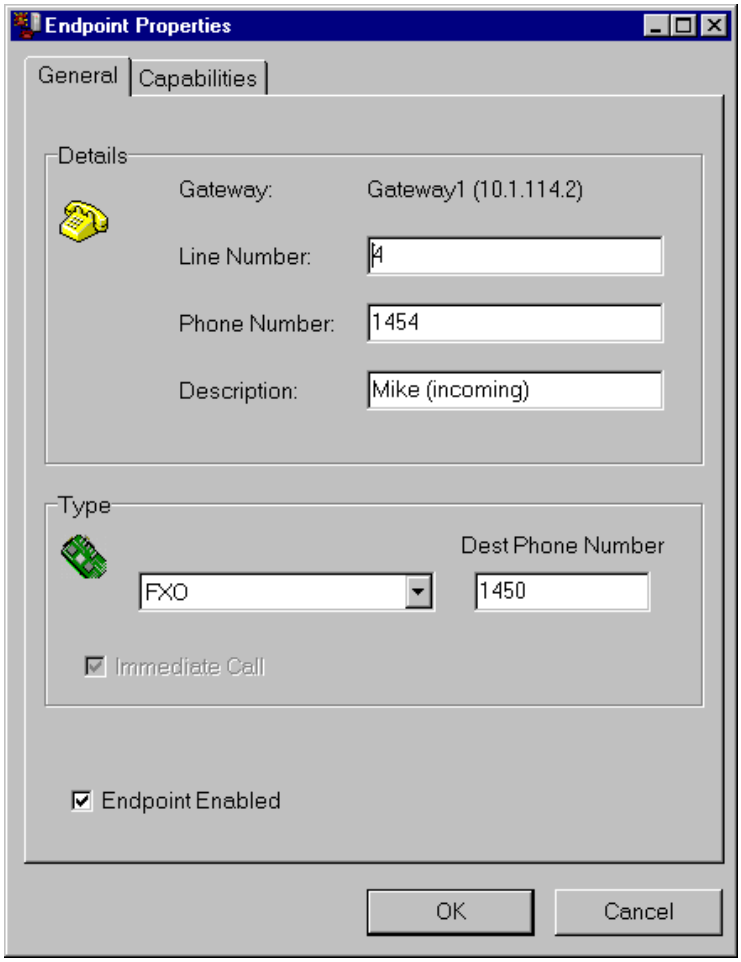
- Volume Level is an Endpoint gain (should be in the range 0-63).
- Type of Service is an indication of the quality of service requested for an IP datagram (should be in the range 0-255).
- Use Gateway's Default Capabilities - if checked, the Endpoint capabilities are defined by the Gateway/Trunk MGCP Defaults; otherwise, check individual capabilities for each Endpoint. If "Use Gateway's Default Capabilities" is checked, then the Endpoint "Capabilities" parameters cannot be edited.

Note: Endpoint capabilities can be changed during Call Manager operation.

2.1.3.1 FXO Type Specific Configuration

For the FXO Endpoint, define the Destination phone number. This number is used for routing the **incoming** Call.

Figure 2-11: FXO Endpoint Specific

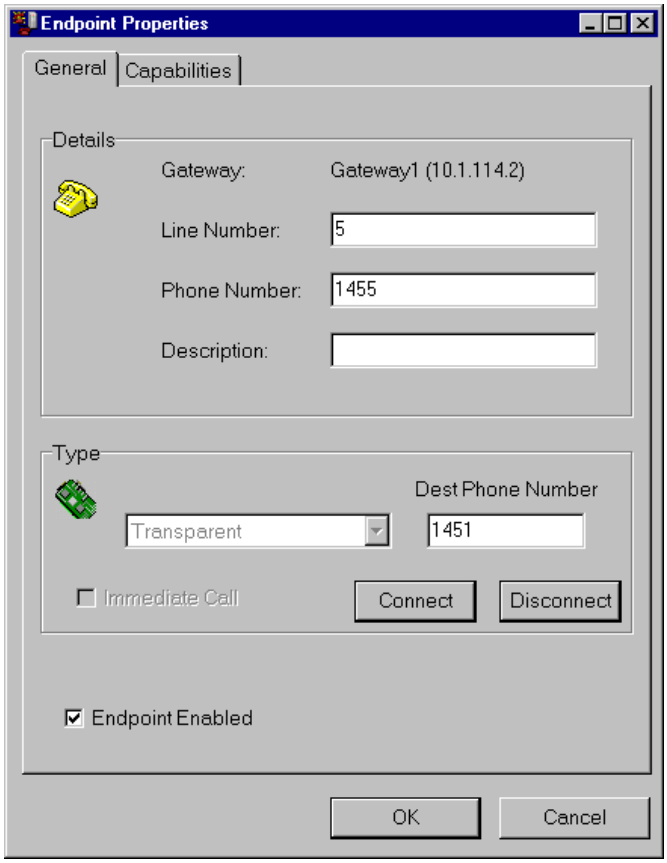


"Destination Phone Number" should be a valid prefix or FXS/FXO Endpoint phone number, belonging to one of the Endpoints controlled by Call Manager.

2.1.3.2 Transparent Type Specific Configuration

For Transparent Endpoint, define the Destination phone number. This number is used for routing the outgoing Call.

Figure 2-12: Transparent Endpoint Specific



"Dest Phone Number" should be a valid FXS or Transparent phone number belonging to one of the Endpoints controlled by Call Manager.

Note: Buttons "Connect" and "Disconnect" are enabled only when Call Manager is activated.

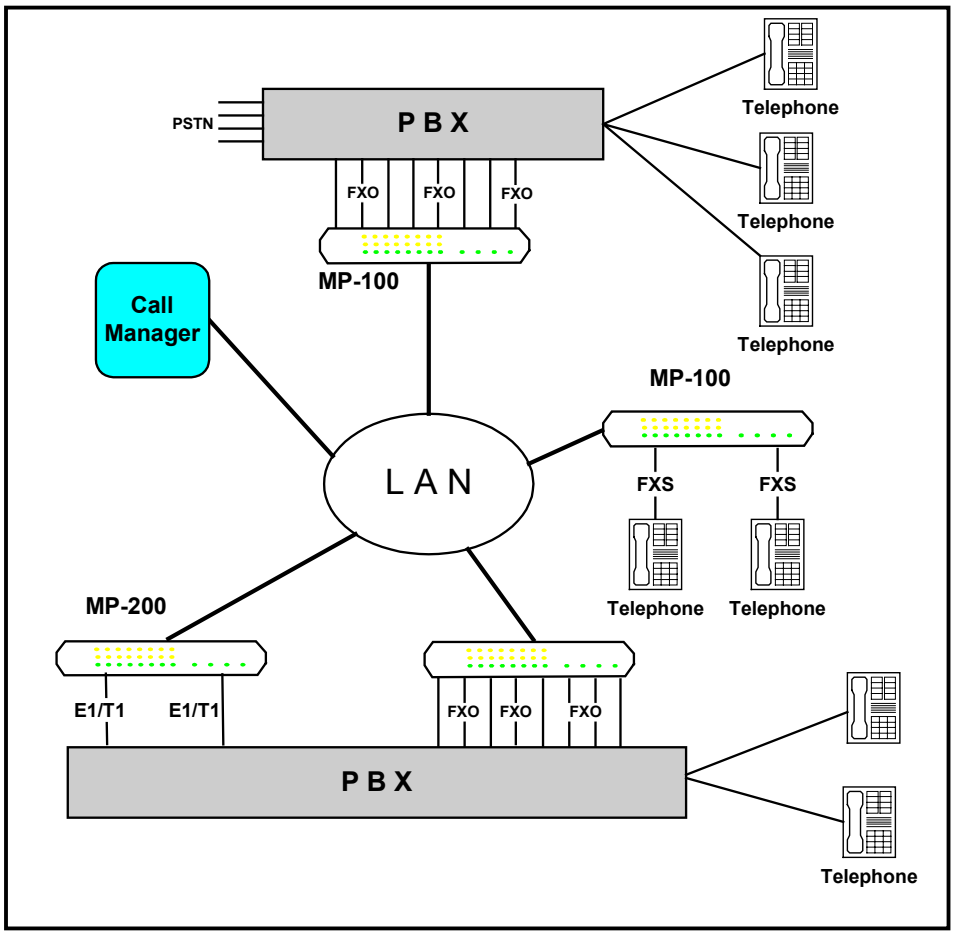
2.1.3.3 E1/T1 Type Specific Configuration

For E1/T1 Endpoints, the User can define the Destination phone number. This number is used as destination in ISDN Q.931 setup message.

2.2 Calls Supported by Call Manager

Call Manager supports the following calls configuration scheme:

Figure 2-13: Supported Calls



2.2.1 FXS *to/from* FXS Call

To make a call from one FXS Endpoint to another, dial the phone number of the destination FXS Endpoint. If it is valid and not busy, the conversation is established.

2.2.2 FXO to/from FXO Call

The Endpoint incoming call is transferred by Call Manager to the FXO "Destination Phone Number" defined for the Endpoint. The type of the call can be used for connecting two PBX via IP.

2.2.3 FXO *to* FXS Call (incoming call)

The Endpoint incoming call is transferred by Call Manager to the "Destination Phone Number" defined for the FXO Endpoint.

2.2.4 FXS *to* FXO Call (outgoing call)

Four ways to make a call from an FXS Endpoint to the FXO Endpoint connected to PBX:

1. Dial '9' from the FXS Endpoint (the User can set another number for the call's type via the "Telephony" tab of the "Call Manager Configuration" window). Call Manager selects a **not busy** FXO line. If all FXO Endpoints are busy, a busy tone is heard.
2. Dial the phone number of the **specific** FXO Endpoint from the FXS Endpoint. If the Endpoint is not busy, the conversation is established through the Endpoint.
3. Dial '8' from the FXS Endpoint (the User can set another number for the call's type via the "Telephony" tab of the "Call Manager Configuration" window). Call Manager searches for the FXO Endpoint for which the "Destination Phone Number" is the Phone Number of the originating FXS Endpoint. If such an Endpoint is found and it's not busy, the conversation is established through this Endpoint.
4. Dial the "prefix" of some FXO gateway. Call Manager selects a line that isn't busy from the gateway with the dialed prefix.

2.2.5 Transparent *to/from* Transparent Call

A Transparent Call is a call without signaling. To make a call, open the "Endpoint Properties" window of the source Endpoint (see "Gateways & Endpoints Configuration" in the manual). Press the "Connect" button; you'll be connected to the phone number defined in the "Destination Phone Number" field. Note that the destination line should be a valid Transparent Endpoint that is not busy.

To finish the call, press the "Disconnect" button in the "Endpoint Properties" window of the source or destination Endpoint.

2.2.6 Transparent *to* FXS Call

Making a call from a Transparent Endpoint to an FXS Endpoint is the same as Transparent to Transparent. On the FXS Endpoint, the usual signaling is applied. When the "Connect" button is pressed on the telephone connected to the destination FXS Endpoint, a ringing tone is heard.

The call is finished when the destination FXS phone is on-hooked, or the "Disconnect" button is pressed in the "Endpoint Properties" window of the Transparent Endpoint.

2.2.7 FXS *to* Transparent Call

To make a call from an FXS Endpoint to a Transparent Endpoint, dial the phone number of the destination Transparent Endpoint. If it is valid and not busy, the conversation is established.

The call is finished when the FXS Endpoint's telephone is on-hooked, or the "Disconnect" button is pressed in the "Endpoint Properties" window of the Transparent Endpoint.

2.2.8 Selecting All Transparent Endpoints

The "Gateways & Endpoints Configuration" window features options to control connections for all Transparent Endpoints defined in the system.

This saves you from having to opening the "Endpoint Properties" window for each of the Transparent Endpoints and pressing the "Connect" or "Disconnect" button, for each selection.

The options are available from the "Gateways" menu of the "Gateways & Endpoints Configuration" window and the "All" key selected in the Gateway's tree.

2.2.9 FXS *to* E1/T1 Call (outgoing call)

Three ways to make a call from an FXS Endpoint to the E1/T1 Trunk connected to PBX:

1. Dial the phone number of a specified B-channel (E1/T1 Endpoint phone number). Call Manager checks that the selected B-channel is valid and the User gets the second dial tone. The second dialed number is set as Destination in the ISDN Q.931 setup message.
2. Dial the "prefix" of some gateway or trunk. Call Manager first selects the **not busy** B-channel (E1/T1 Endpoint) of the specified Gateway/Trunk, and the User gets the second dial tone as before.
3. Define the destination phone number for an ISDN Q.931 setup message manually per B-channel; the second dial tone is not heard. To manually define the destination, select the "Immediate Call" check box of the E1/T1 Endpoint and in the "Destination Phone Number" field, set the ISDN destination.

2.2.10 E1/T1 *to* FXS Call (incoming call)

Destination FXS phone number is retrieved from the incoming ISDN Q.931 setup message.

2.2.11 E1/T1 *to* E1/T1 Call (tandem call)

"Destination" filed in the incoming ISDN Q.931 setup message must be a valid E1/T1 Endpoint phone number or one of the Gateway/Trunk prefixes defined in the system.

2.3 Call Manager Activation/Deactivation

To activate the program, press the "Start" button in Call Manager's main window, or select the option "Start Call Manager" from the File menu.

To deactivate Call Manager, press the "Stop" button or select the option "Stop Call Manager" from the File menu.

When Call Manager has stopped, it tries to delete any connections that still exist on some Endpoints. The feature can be disabled via the "Configurations" window ("General" tab). If the feature is disabled when the application is closed, some RTP packages could possibly still be on the network. To stop sending the packages, the MGCP command DLCX must be executed on each sending Endpoint.

In the application, there is an option to send a DLCX command to all Endpoints of the selected Gateway. The option is available from the "Gateways & Endpoints Configuration" window. Select one of the listed Gateways (the "All" option can also be used), right-click and choose the "Delete Connections" option.

2.3.1 Debug Window

If the Log Messages are selected, they appear in the Debug dialog. The window is opened together with the main window of the application.

To clear messages in the Debug dialog, choose the "Tools" menu and then the "Clear Debug Messages" option.

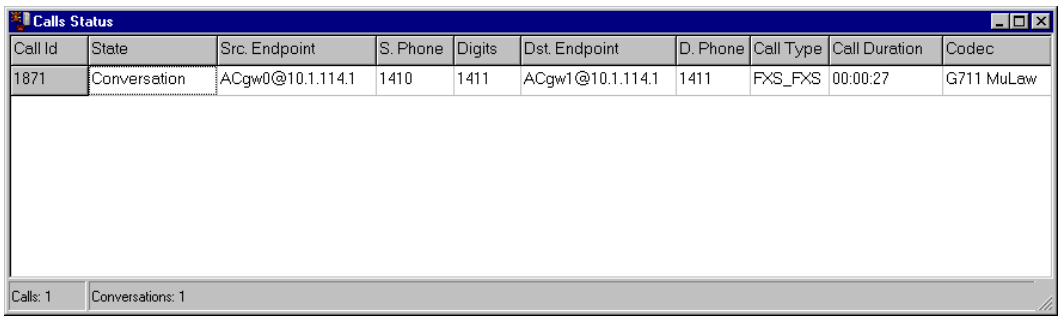
If the window is closed, it can be reopened by selecting the option "Debug Messages" from the "View" menu.

To temporary stop messages in the Debug window, right-click in the main application window. From the open menu, choose the option "Stop Debug Messages". To enable the messages again, choose the option "Run Debug Messages" from the same menu as before.

2.3.2 Call Status

View the status of current Calls by pressing the "Calls" button or choosing the "Calls Status" option in the "View" menu.

Figure 2-14: Calls Status



Run-time information on the calls is displayed in the above window.

To stop displaying data in the window, right-click and choose the option "Freeze" from the Open menu.

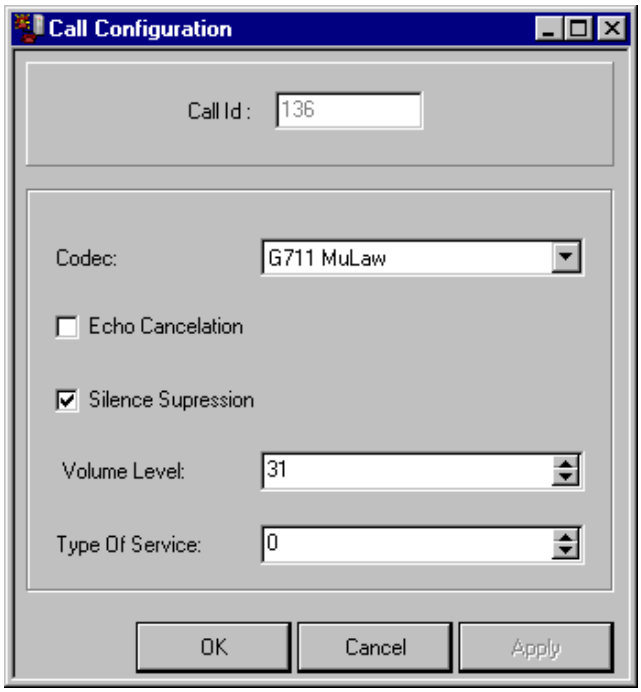
To run the window again, right-click and choose the option "Run" from the Open menu.

The Status bar displays number of open calls and how many calls are in the "Conversation" state (voice can be passed).

2.3.2.1 Call Configuration

For Calls **"Conversation",** a call can be reconfigured in run time by clicking on "Call Id".

Figure 2-15: Call Configuration



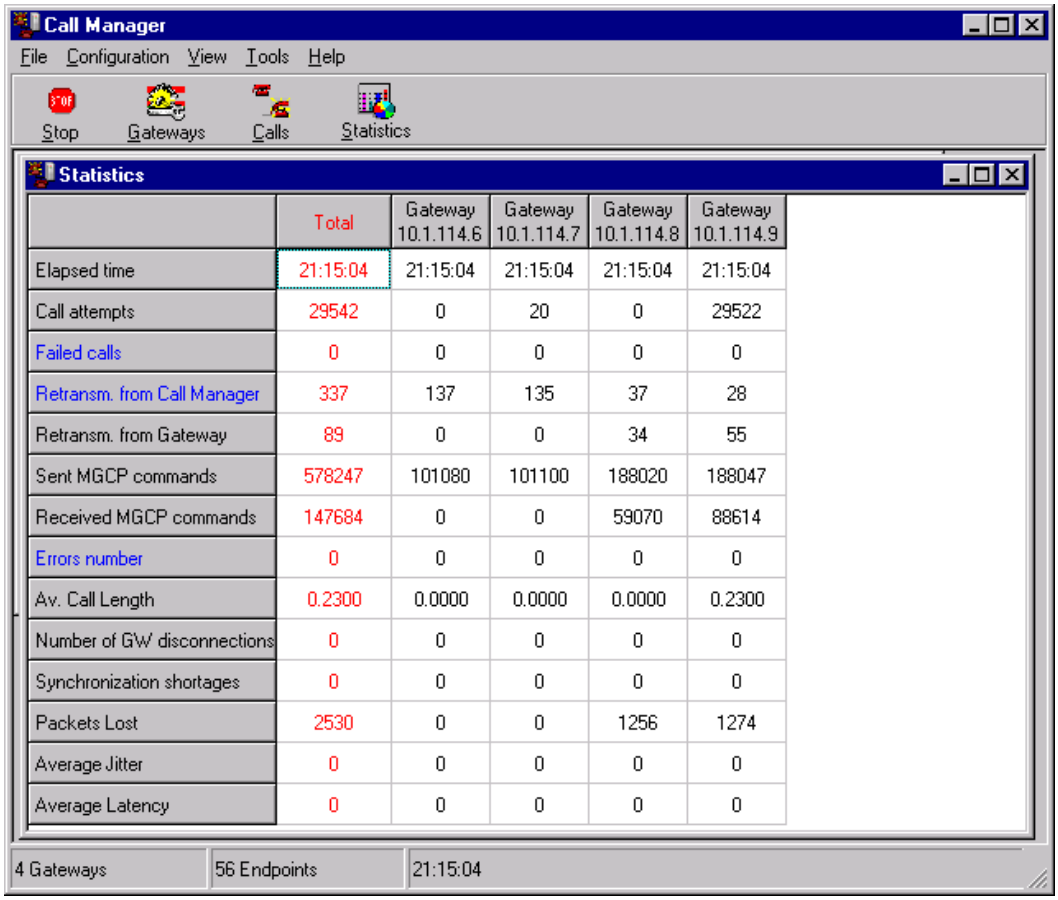
All parameters in the above window (except "Call Id") can be changed. By pressing "Apply" or "OK" button, all changes are applied.

If the configured Call is finished, its "Configuration" window is closed automatically.

2.3.3 Statistics

To view the statistics parameters of the current session, click the "Statistics" button or choose the "Statistics" option in the "View" menu.

Figure 2-16: Statistics



	Total	Gateway 10.1.114.6	Gateway 10.1.114.7	Gateway 10.1.114.8	Gateway 10.1.114.9
Elapsed time	21:15:04	21:15:04	21:15:04	21:15:04	21:15:04
Call attempts	29542	0	20	0	29522
Failed calls	0	0	0	0	0
Retransm. from Call Manager	337	137	135	37	28
Retransm. from Gateway	89	0	0	34	55
Sent MGCP commands	578247	101080	101100	188020	188047
Received MGCP commands	147684	0	0	59070	88614
Errors number	0	0	0	0	0
Av. Call Length	0.2300	0.0000	0.0000	0.0000	0.2300
Number of GW disconnections	0	0	0	0	0
Synchronization shortages	0	0	0	0	0
Packets Lost	2530	0	0	1256	1274
Average Jitter	0	0	0	0	0
Average Latency	0	0	0	0	0

Each statistic counter is per Gateway. "Total" is a sum or an average of the Gateway's counters. Sometimes while updating statistic parameters, it's impossible to know to which Gateway the event belongs. In this case, only the "Total" counter is updated.

Automatic reset of all data in the window is performed when Call Manager is activated.

All counters are updated every second.

To stop displaying data in the window, right-click and choose the option "Freeze" from the open menu.

To run the window again, right-click and choose the option "Run" from the open menu.

To reset counters of specific Gateway, or counters of all defined Gateways, in run time, right-click on the title of the Gateway to reset (or "Total" to reset all) and choose the option "Reset Gateway Counters" from the open menu.

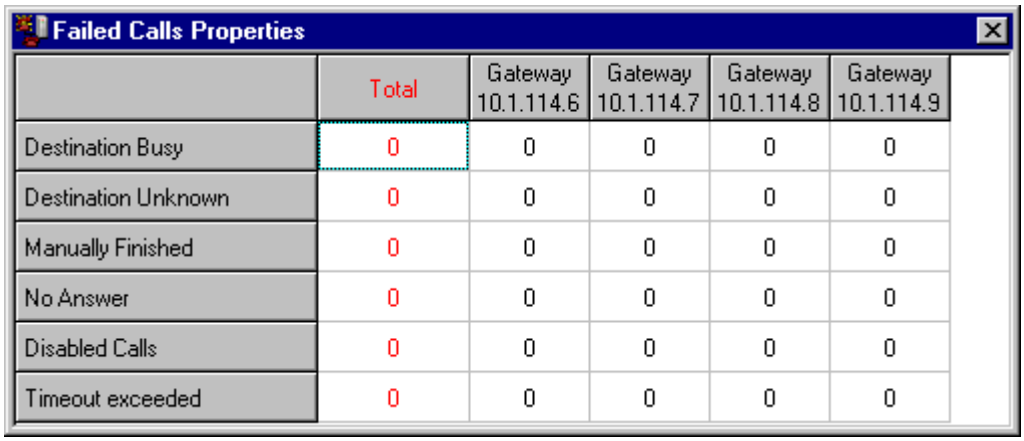
Description of Statistic parameters:

- *Elapsed Time* - time elapsed from last reset.
- *Call Attempts* - number of attempts to call.
- *Failed Calls* - number of unsuccessful calls (conversation hasn't been established).
- *Retransmissions from Call Manager* - number of times some MGCP command or response was retransmitted by Call Manager.
- *Retransmissions from Gateway* - number of times some MGCP command or response was retransmitted by Gateway.
- *Sent MGCP commands* - total number of sent MGCP commands.
- *Received MGCP commands* - total number of received MGCP commands.
- *Error number* - total number of errors in the system.
- *Av. Call Length* - average length of Call per Gateway and per the system.
- *Number of GW disconnections* - number of times Call Manager lost communication with Gateway.
- *Synchronization shortages* - number of times there was no synchronization between endpoint's state inside Gateway and endpoint's state in the internal Call Manager's state machine.
- *Packets Lost* - total number of lost packets.
- *Average Jitter* - average estimate of the statistical variance of the RTP data packet interval time measured in milliseconds.
- *Average Latency* - average estimate of the network latency in msec.

To obtain properties for some of the above parameters (having blue titles in Figure 2-16), click on the chosen title; the "Properties" window opens.

This option is available for all parameters shown in Figure 2-17, Figure 2-18 and Figure 2-19.

Figure 2-17: Failed Calls Properties

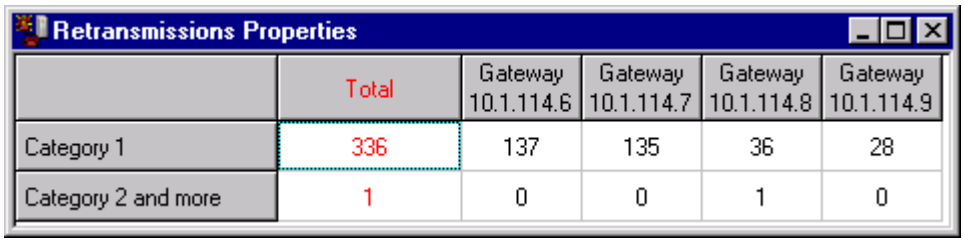


The window presents the types of failed calls, each with a counter.

Description of the above parameters:

- *Destination Busy* - destination endpoint is busy.
- *Destination Unknown* - not a valid destination phone number.
- *Manually Finished* - the call is interrupted before dialing a phone number.
- *No Answer* - no answer at the destination.
- *Disabled Calls* - one of the endpoints that participates in the Call is manually disabled (via "Gateways & Endpoints Configuration" window).
- *Timeout exceeded* – the Call is terminated when timeout is exceeded in one of the states of the call's state machine.

Figure 2-18: Retransmission Properties



	Total	Gateway 10.1.114.6	Gateway 10.1.114.7	Gateway 10.1.114.8	Gateway 10.1.114.9
Category 1	336	137	135	36	28
Category 2 and more	1	0	0	1	0

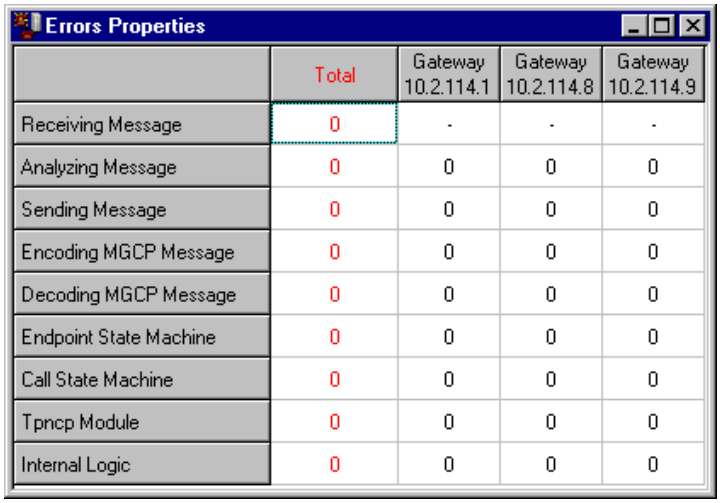
For each MGCP command sent, Call Manager expects to get an acknowledgment.

If there is no acknowledgment within the defined period of time (this can be set in the "Call Manager Configuration" window), the same command is retransmitted once. The next retransmission is always after twice the previous period of time.

The above window shows the number of commands sent within each period.

- *Category 1* – the number of commands sent during the first retransmission.
- *Category 2 and more* – the number of commands sent after the first retransmission.

Figure 2-19: Error Properties



	Total	Gateway 10.2.114.1	Gateway 10.2.114.8	Gateway 10.2.114.9
Receiving Message	0	-	-	-
Analyzing Message	0	0	0	0
Sending Message	0	0	0	0
Encoding MGCP Message	0	0	0	0
Decoding MGCP Message	0	0	0	0
Endpoint State Machine	0	0	0	0
Call State Machine	0	0	0	0
Tpncp Module	0	0	0	0
Internal Logic	0	0	0	0

All error messages in the system are classified according to the following list.

Error classification:

- *Receiving Message* - an error in the network socket or in the thread that manages incoming messages.
- *Analyzing message* - unexpected MGCP command's or response's format.
- *Sending Message* - an error in the network socket or in the thread that manages outgoing messages.
- *Encoding MGCP Messages* - an error while composing MGCP message to send.
- *Decoding MGCP Message* - parser error.
- *Endpoint State Machine* - received unexpected event for a current state of Endpoint's State Machine.
- *Call State Machine* - received unexpected event for a current state of Call's State Machine.
- *TPNCP Module* – an error in the VoIPLib (error event is received) or an error while executing VoIPLib command.
- *Internal Logic* - all other possible errors (memory management, data management, etc.). Usually such errors are critical.

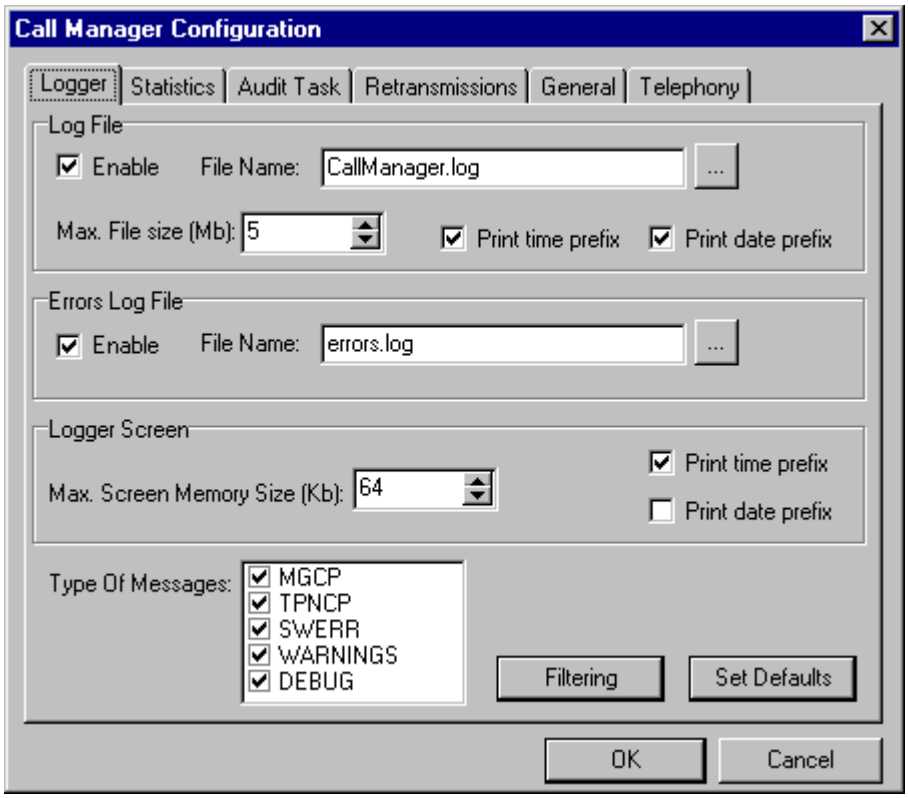
2.4 Call Manager Configuration

Select "Configuration" and then "Call Manager"

2.4.1 Logger

The selection enables configuring the application's Log Messages.

Figure 2-20: Logger Configuration



2.4.1.1 Configuring the Log File of the Application

- If the check box “Enable Log File” is checked, all Log messages are saved in the log file, the name being specified in the text field “File Name”.
- When the size of the Log File reaches its maximum (“Max. File size”) a new Log File is started (with new name).
  For example, if the source Log File’s name was logfile.log, then following files are logfile_1.log, logfile_2.log and so on.
- Log messages can be saved with the current date and time.

2.4.1.2 Configuring the Errors Log File of the Application

- If the check box “Enable Errors Log File” is checked, all Log messages of type ‘SWERR’ or ‘WARNINGS are saved in the file, the

name being specified in the text field "File Name".
The same messages can be found inside the regular Log File.

2.4.1.3 Configuring the Logger Window

Displays Log messages in the "Debug" window

- The maximum number of displayed messages can be managed by changing "Max. Screen Memory Size" parameter.
- Log messages can be saved with the current date and time.

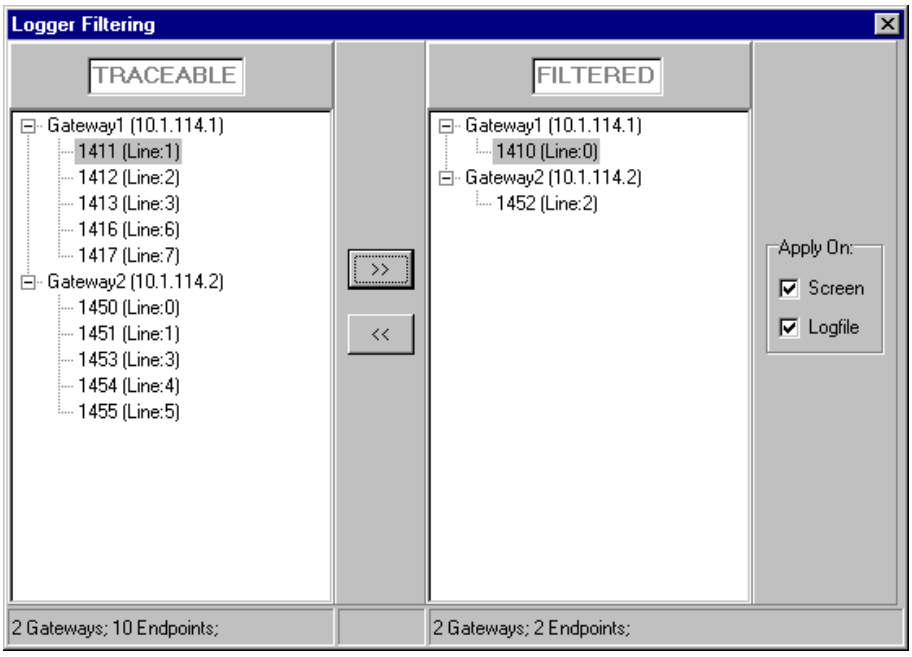
There are five types of log messages:

MGCP	– Commands of the Media Gateway Control Protocol.
TPNCP	– Commands of the TPNCP.
SWERR	– Unsupported events in the program's state machines or internal logic errors.
WARNINGS	– Notifications about communication problems and failed calls.
DEBUG	– Different debug messages of the program.

2.4.1.4 Message Filtering

The User can cancel Log Messages for some gateways/trunks/endpoints by pressing the “Filtering” button.

Figure 2-21: Logger Filtering



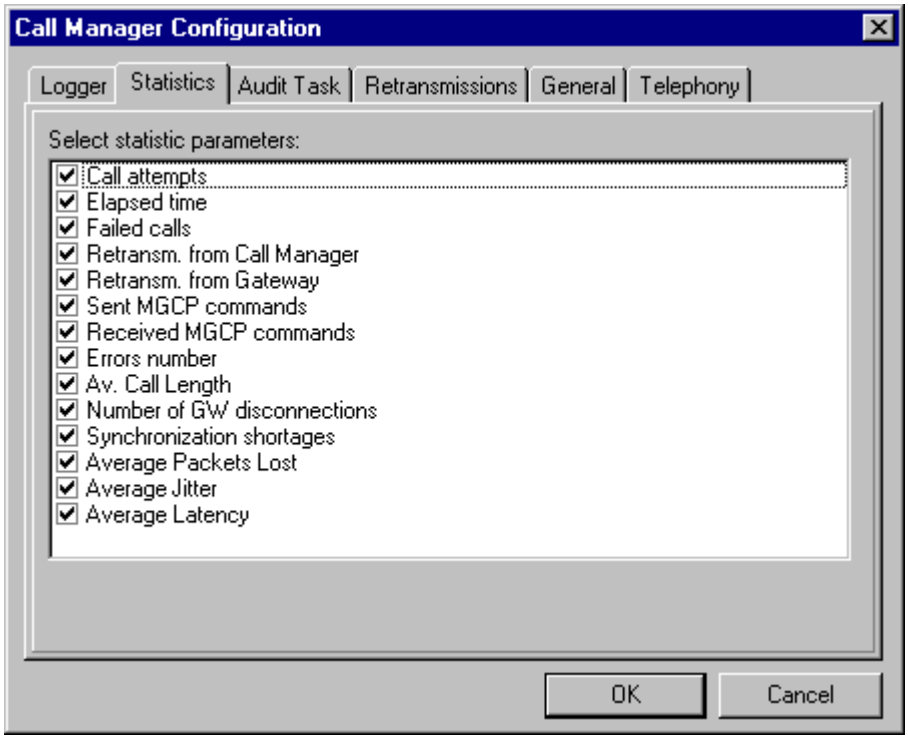
The two-pane window enables Log Messages filtering. The left pane displays all **unfiltered** gateways and endpoints. The right pane displays all **filtered** gateways and endpoints. To move gateways/endpoints between the two panes, use the buttons with arrows.

The filter can be applied for messages printed on the screen, into the Log file, or both. The feature can be managed by checking the “Apply On” check boxes.

2.4.2 Statistics

Select "Statistics" tab.

Figure 2-22: Statistics Configuration

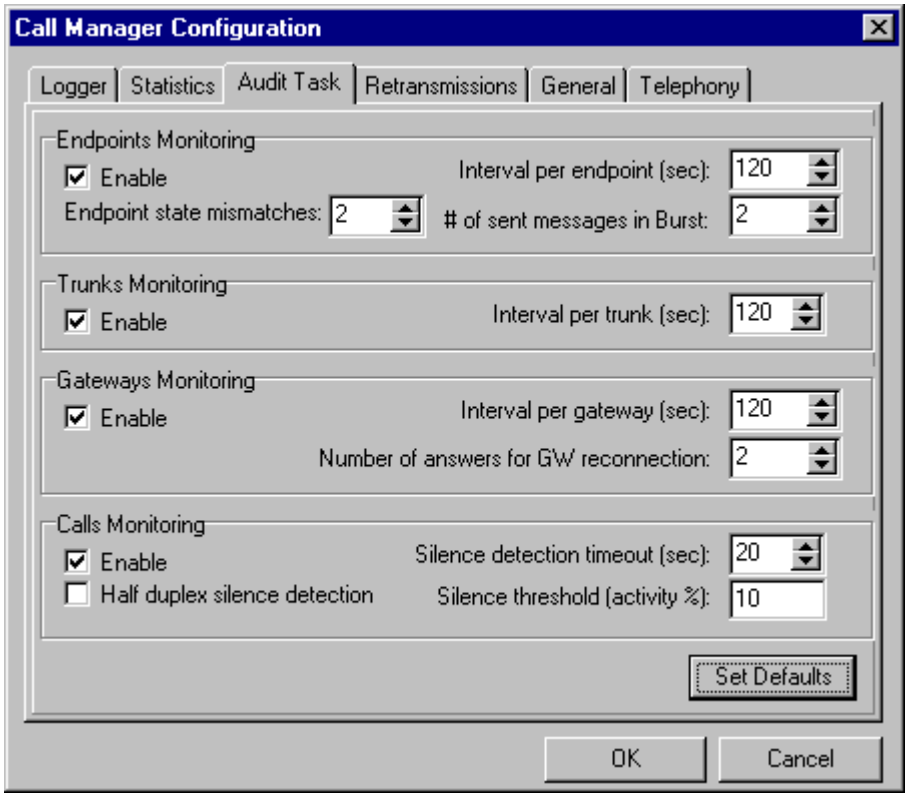


Use the check boxes in the above window to determine what Statistics parameters are displayed in the "Statistics" window.

2.4.3 Audit Task

Select "Audit Task" tab.

Figure 2-23: Audit Task Configuration



2.4.3.1 Endpoints Monitoring Configuring

The task works for MGCP endpoints only. This means it does not work for E1/T1 type.

If check box “Enable” is checked, then the Endpoints Monitor is active.

The purpose of the task is synchronization between logical and actual endpoints’ states and lists of requested events.

The task continuously sends “AUEP” to all endpoints defined in the system.

To manage the task’s performance, the User can change the following parameters:

- “Endpoint state mismatches” – maximum number of synchronization mismatches. When the specified number of mismatches has occurred for some Endpoint, the logical Endpoint’s state is updated

(if the Endpoint is participating in some call, then the call is interrupted).

- "Number of sent messages in burst" – maximum number of AUEP commands sent in one burst (the command is not sent to all defined endpoints at once in order not to overload the network).
- "Interval per Endpoint" – the time interval between sequential AUEP commands per endpoint.

2.4.3.2 Configuration of Trunk Monitoring

If the check box "Enable" is checked, the Trunks Monitor is active.

The purpose of the task is to verify alarm and D-channel statuses of all enabled E1/T1 Trunks.

The task continuously sends acPSTNGetAlarmStatus() and acISDNGetDChannelStatus() (for PRI ISDN protocol only) to every E1/T1 trunk defined in the system.

2.4.3.3 Configuration of Gateway Monitoring

If the check box "Enable" is checked, then the Gateways Monitor is active.

The purpose of the task is to verify connection with all enabled Gateways.

The task continuously sends "AUEP" to one endpoint of every gateway (not E1/T1) defined in the system.

For E1/T1 trunk gateways monitoring, use the TPNCP command: acGetBoardStatus().

To manage a performance of the task, the User can change the following parameters:

- "Interval per Gateway" – the time interval between sequential requests per gateway.
- "Number of answers for GW reconnection" – number of answers from a disconnected Gateway to reconnect the Gateway again.

2.4.3.4 Configuration of Call Monitoring

If the check box "Enable" is checked, the Calls Monitor is active.

The purpose of the task is to detect silence during "FXO to FXO" calls.

The task continuously sends "AUCX" to both connections of the call. Usually, it can be used when there is no other way to detect the end of a call.

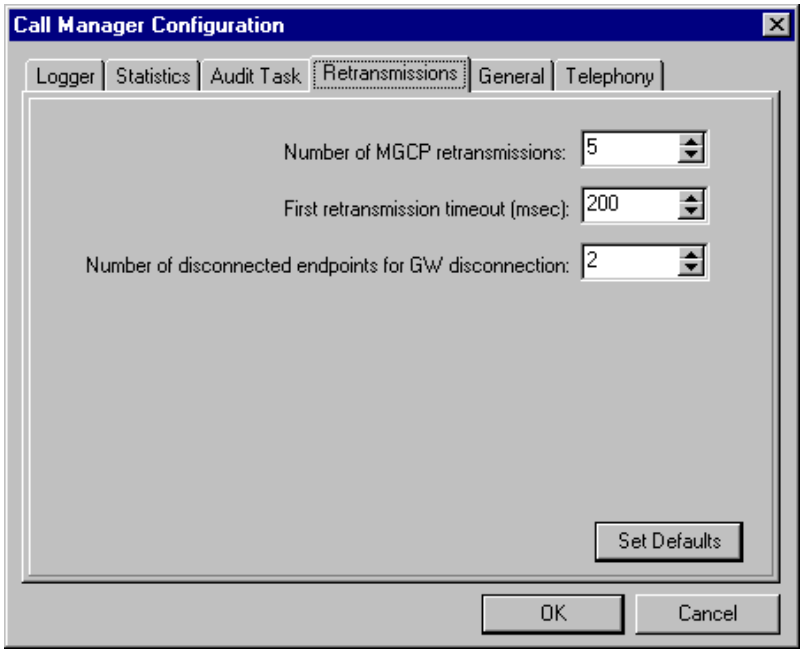
Configuration parameters:

- "Half-duplex silence detection" – if checked, silence detection for one of two connections is enough to disconnect the call.
- "Silence detection timeout" – the time interval (in seconds) between sequential AUCX commands per connection.
- "Silence threshold (activity)" – a threshold that defines "silence". It's a percentage of maximum RTP packets flow for the connection.

2.4.4 Retransmissions

Select the "Retransmissions" tab.

Figure 2-24: Retransmissions Configuration



Call Manager provides a timeout for all outstanding commands and retries them when timeouts are exceeded. When repeated commands fail to be acknowledged, the host endpoint becomes 'disconnected'.

Configured parameters:

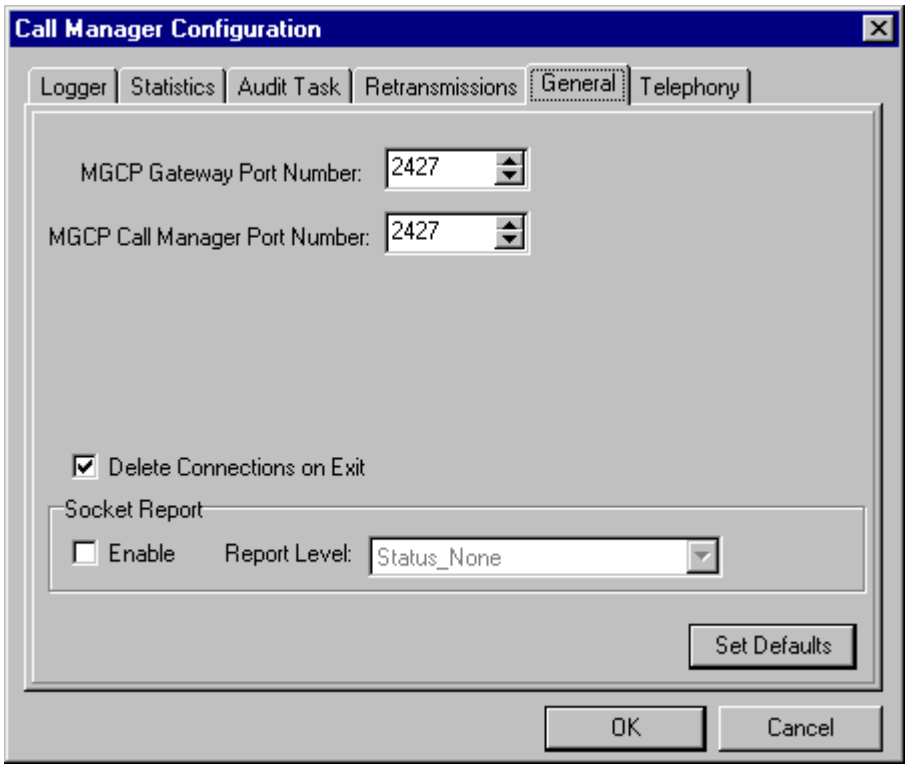
- "First retransmission timeout" - timeout for outstanding command.
- "Number of MGCP retransmissions" - maximum number of retransmissions for outstanding command.

- "Number of disconnected endpoints for GW disconnection" - number of disconnected endpoints that require to be marked that its Gateway is disconnected.

2.4.5 General

Select the "General" tab.

Figure 2-25: General Configuration



- "MGCP Gateway Port Number" - number of MGCP port to send messages.
- "MGCP Call Manager Port Number" - number of port to listen to MGCP messages.
- "Delete Connections on Exit" – if the check box is checked and the program is exited or deactivated, any connections that still exist on some Endpoint are automatically deleted.

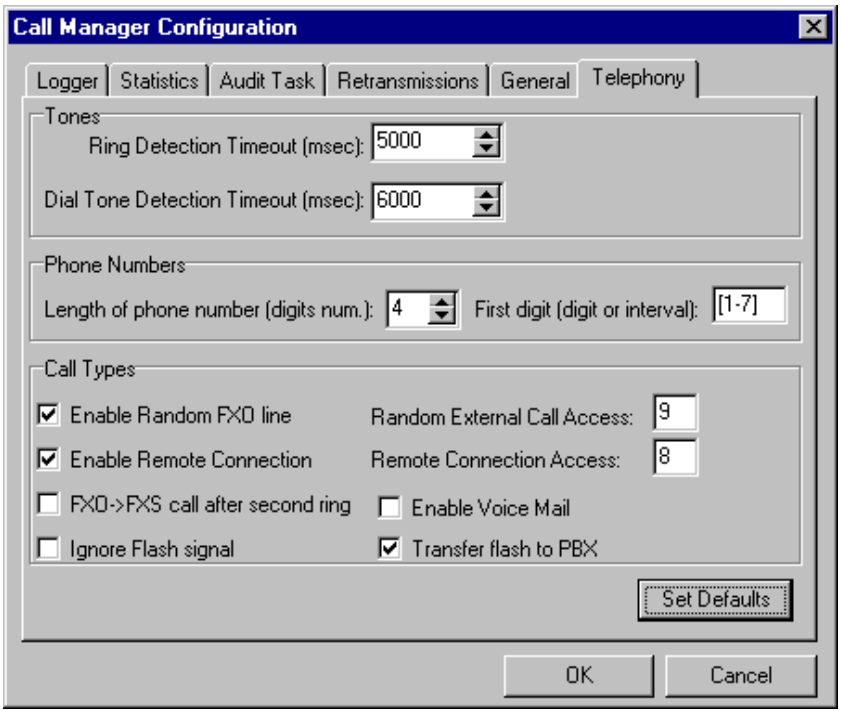
Socket Report group box allows debugger options to be set for the UDP socket:

- To enable the debugger, check the “Enable” check box.
- Choose the debugger’s report level by selecting one of the options in the Combo box “Report Level”.

2.4.6 Telephony

Select the “Telephony” tab.

Figure 2-26: Telephony Configuration



2.4.6.1 Tone Parameters

- “Ring detection timeout” – timeout between sequential ring signals on the FXO endpoint.
- “Dial Tone Detection Timeout” – timeout to detect dial tone on FXO line (not used in version 2.2).

2.4.6.2 Configuring Phone Numbers

- "Length of phone number" – number of digits in the endpoint's phone number.
- "First digit" – first digit phone's number interval. May be defined as one digit, in which case all phone numbers have to begin with that digit. Alternately, it may be defined as interval in format: [from-to].

2.4.6.3 Configuring Call Types

- If the "Enable Random FXO line" check box is checked, then by dialing a number specified in the text field "Random External Call Access", the User can get the first non-busy FXO line.
- If the "Enable Remote Connection" check box is checked, then by dialing a number specified in the text field "Remote Connection Access", the User can get their "own" FXO line. The "own" FXO line is one where its "Destination Phone Number" is the phone number of the Caller.
- If the "FXO->FXS call after second ring" check box is checked, then FXO->FXS call is started after second ring signal detection only. The option can be useful if the User starts to get "junk" calls from the PBX (maybe as result of voice mail notification).
- If the "Enable Voice Mail" check box is checked, then for FXO-to-FXS calls the phone number of the source FXO gateway is dialed as the FXS answers. It's used when it is important for the FXS endpoint to know the source gateway of the call.
- If the "Ignore Flash signal" check box is checked, then all flash signals are ignored. In such a case, transferred and waiting calls are not possible. When the check box is unchecked, flash signals are processed by Call Manager, so waiting and transfer calls are possible.
- When the "Transfer flash to PBX" check box is checked, for FXS <-> FXO calls the flash signal is automatically transferred to the PBX that the FXO endpoint is connected to.

US: AudioCodes Inc, 2890 Zanker Road, Suite # 200, San Jose, CA 95134.
Tel: 408-577-0488 - Fax: 408-577-0492
International: AudioCodes Ltd, 4 HaHoresh Road, PO Box 14, Yehud 56470, Israel.
Tel: +972-3-539 4000 - Fax: +972-3-539 4040
China: AudioCodes, # 2721, South Tower, Kerry Center
1 Gaung Hua Road, Chao Yang District, Beijing 100020, P.R.China
Tel: 86-10-8529-9706 - Fax: 86-10-8529-9707
Technical Support: support@audiocodes.com